

center being filled with a granular substance (fig. 9). Around this row are one or two regular rows of thick-walled cells and others irregularly arranged. Near the perimeter of the section are the oil glands formed by regular rows of rather narrow, elongated, rectangular cells; and about these are irregularly arranged cells. Next the perimeter the cells are small, but the size increases further inward to the fibro-vascular bundles, between which, and in the center column, the cells are smaller.

A section through the same specimen at the beginning of the loculi shows some small fibro-vascular bundles surrounded by very small, empty, thin-walled cells. The bundles in the center column are broad and narrow, but further into the interior of the fruit they become rounded and smaller. The oil glands are well developed.

EXPLANATION OF PLATE XVI.—Fig. 1. Cross section of mature lemon, showing half the section; *a*, yellow part of rind; *b*, white part of rind; *c*, loculus filled with pulp; *d*, spongy center column; *e*, double wall of the loculi; *f* and *g*, fibro-vascular bundles. Fig 2. Cross section of young fruit 3.5 mm. in diam.; *a*, loculus; *b*, ovule; *c*, center column; *d*, fibro-vascular bundle; *e*, oil gland; *d'*, fibro-vascular bundles of rind; *f*, rind, Fig. 3. Cells of wall of pulp club. Fig. 4. Cells containing juice in the pulp clubs. Fig. 5. Leaf; *a*, midvein; *b*, smaller veins; *c*, marginal vein; *c'*, submarginal vein. Fig. 6. Back of loculus; *a*, large fibro vascular bundle; *b*, smaller bundles forming a network. Fig. 7. Side view of loculus; *a, a*, curved fibro-vascular bundle; *b*, back of loculus; *c*, minute bundles seen in side wall of loculus. Fig. 8. Loculus showing both ovules developing, the section being such that the nuclei are exposed; *a*, loculus; *b*, nucleus of seed; *c*, inner wall about nucleus; *c'*, outer wall of ovule; *a'*, ovule. Fig 9. Section through upper end of lemon  $\frac{1}{2}$  in. in diam.; *a*, epidermis; *b*, cells about oil gland *c*; *d*, cells of rind; *e*, dense center of fibro-vascular bundle; *f*, cells about center.

*Champaign, Ill.*

## EDITORIAL.

THE APPEARANCE of Dr. Merriam's report of a biological survey of the San Francisco mountain region of Arizona (noticed elsewhere in this number) suggests a timely topic for botanists to consider. This same subject was prominently before the botanists of the American Association at their Indianapolis meeting, in considering the geographical distribution of North American plants. The notion that a plant is only valuable because it is a new or rare species, and that it makes no special difference as to its exact locality, its soil conditions, or its altitude, is one that should

be remanded to the limbo of unscientific methods. The problem that is now presenting itself to North American workers in systematic botany lies behind all systematic botany, and considers geographical distribution. But no study of this subject can be made at long range or by the most persistent study of the disjointed facts at our command.

It is time that botanists bestir themselves in the matter and consider the organization of a regular biological survey, that will deal with plants as biological problems and not merely as specimens to be catalogued. The money which is now expended for botanical exploration could be made to serve handsomely in starting such a systematic survey. It is no special credit to American botany that a zoologist who is working in this systematic fashion can find no help from botanists, but is compelled to combine a botanical survey with his own. Not that the two departments should be worked separately, for a biological survey must include both, but the point is made that botanists should do their share. Dr. Merriam is to be thanked for his example, and he would only feel that it was facilitating his work if botanical explorations could be converted into biological surveys.

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### BRIEFER ARTICLES.

**The translation of Hackel's "True Grasses."**—This work received a notice in your journal for August, by Mr. Theo. Holm. As to the translation I have no doubt that it is faithfully executed, and that it is accurate, clear and scientifically correct. For students of grasses this work must possess great interest and value. The illustrations are excellent and will be a great aid to the understanding of the technical descriptions. While this work can not, perhaps, be excelled as a synopsis of all known genera of grasses, it may be a question whether a reduction and modification of it adapted to the United States or to North America would not be more generally useful in this country. Of 313 genera described, there are in this country, of native and introduced ones, only about 120 genera. The work of local students in identifying a grass would be much reduced if they only had occasion to take into view the genera proper to this country. True, the general range of each genus is stated, and the student can, when investigating a species, leave out of view those whose range is beyond the limits of our country. But there are some omissions in regard to range, etc., in consequence of which the student might fail to find what he wanted. I will refer to a few instances: on page 53, under the genus *Rottboellia*, sub genus 1, it is said, "species twenty in the tropics of both hemispheres." Our species might be overlooked from this statement, one ranging as far north as Delaware, and another as far as eastern Arkansas. On the same page under the subgenus *Hemarthria* nothing is said of its extension to Texas, where the species *fasciculata* is abundant in some localities.